National Transportation Safety Board

NTSB Update to the Twin Cessna Flyer Annual Convention

Robert Sumwalt

April 28, 2016

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EventDate	Location	InjurySeverity	AircraftDamage	RegistrationNumber	Make	Model
12/13/2015	Kennesaw, GA	Non-Fatal	Substantial	N7675Q	CESSNA	310
10/23/2015	Primm, NV	Non-Fatal	Substantial	N310CD	CESSNA	310C
10/14/2015	Amarillo, TX	Non-Fatal	Substantial	N19CH	CESSNA	421
10/14/2015	Hammond, LA	Fatal(2)	Destroyed	N33FA	CESSNA	421B
10/10/2015	Tucson, AZ	Non-Fatal	Substantial	N3123L	CESSNA	310J
09/21/2015	Platteville, WI	Non-Fatal	Substantial	N813CA	CESSNA	421B
08/26/2015	Titusville, FL	Fatal(1)	Destroyed	N90PS	CESSNA	310R
08/08/2015	VEREDA GUARIGUA CAJICA, Colo	Fatal(3)	Substantial		CESSNA	402B
07/12/2015	South St. Paul, MN	Non-Fatal	Substantial	N5139J	NA	340
04/17/2015	Diboll, TX	Non-Fatal	Substantial	N421PK	A	421B
04/07/2015	Bloomington, IL	Fatal(7)	Substantial		R	414A
03/20/2015	St. George, UT	Non-Fatal	Substantial			310Q
02/10/2015	Isla de Vieques, PR	Non-Fatal				402C
01/28/2015	Rothville, MO	Non-Fatal			CESSNA	310B
12/30/2014	Englewood, CO				CESSNA	404
12/27/2014	Liberty, NC			7JD	CESSNA	310N
12/18/2014	San Antonio, TX			N700MA	CESSNA	310J
11/17/2014	Fulton		Substantial	N401ME	CESSNA	401A
10/24/2014			Substantial	N310WL	CESSNA	310R
08/27/2014		Non-Fatal	Substantial	N101JB	CESSNA	310K
08/27/2014		Fatal(4)	Destroyed	N51RX	CESSNA	421C
08/18/2014	F amas	Fatal(4)	Destroyed	N340MM	CESSNA	340A
08/15/2014	Bu e, TX	Fatal(2)	Destroyed	N127BC	CESSNA	414
06/26/2014	Maryland Heights, MO	Non-Fatal	Destroyed	N1552T	CESSNA	414
06/16/2014	Pleasanton, TX	Non-Fatal	Substantial	N1671T	CESSNA	414
05/24/2014	Dallas, TX	Non-Fatal	Substantial	N936U	CESSNA	421A
04/22/2014	Horseshoe Bay, TX	Non-Fatal	Substantial	N866BS	CESSNA	421
03/20/2014	Charleston, SC	Non-Fatal	Substantial	N5929M	CESSNA	421
03/14/2014	Stuart, FL	Non-Fatal	Substantial	N419AR	CESSNA	402B
03/08/2014	Wapakoneta, OH	Unavailable	Substantial	N69980	CESSNA	310Q
02/18/2014	Toussus-Le-Noble, France	Non-Fatal	Substantial	N876DT	CESSNA	340
01/28/2014	Aurora, CO	Non-Fatal	Substantial	N8133M	CESSNA	310I
01/23/2014	Ashland, MO	Non-Fatal	Substantial	N414CJ	CESSNA	414A

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2015 U.S. Aircraft Accidents

- U.S. Part 121 Carriers: 25 accidents (No majors)
  - 0 fatalities
- U.S. Part 135 Carriers: 43 accidents
  - 28 fatalities
- U.S. General Aviation: 1207accidents
  - 377 fatalities

Courtesy Member Earl Weener

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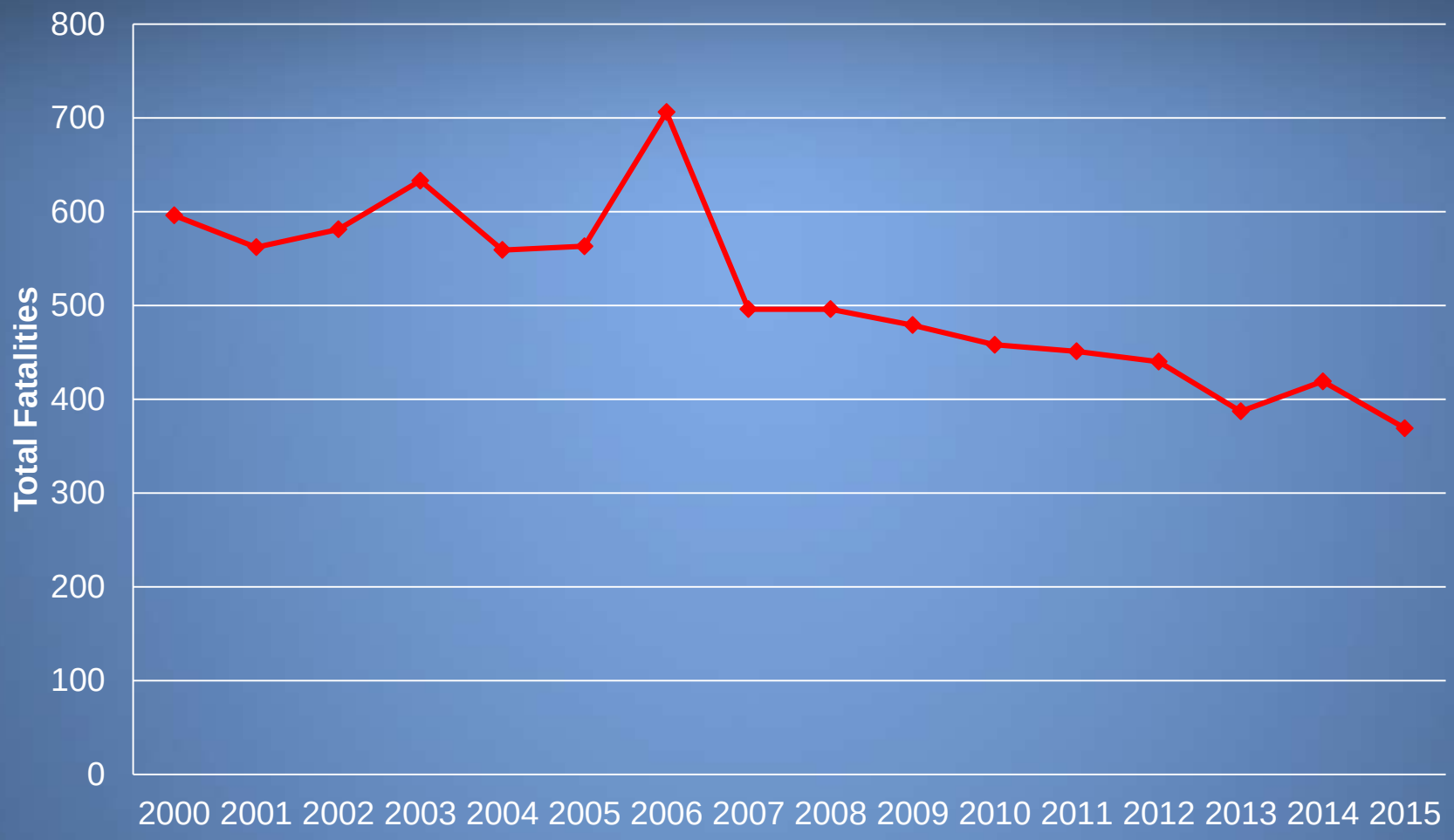
GA Accident-involved Fatalities



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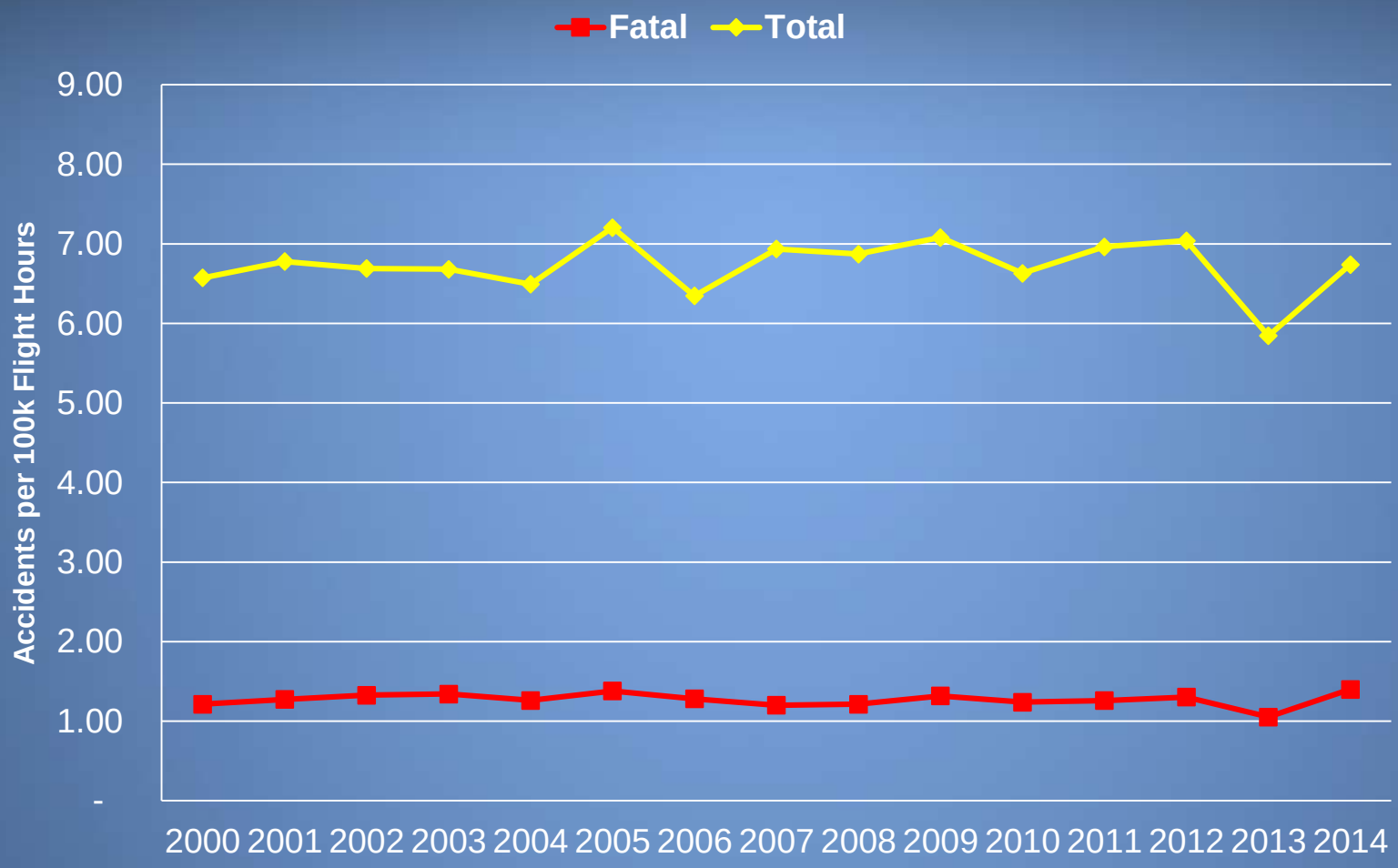
GA Accident Rates



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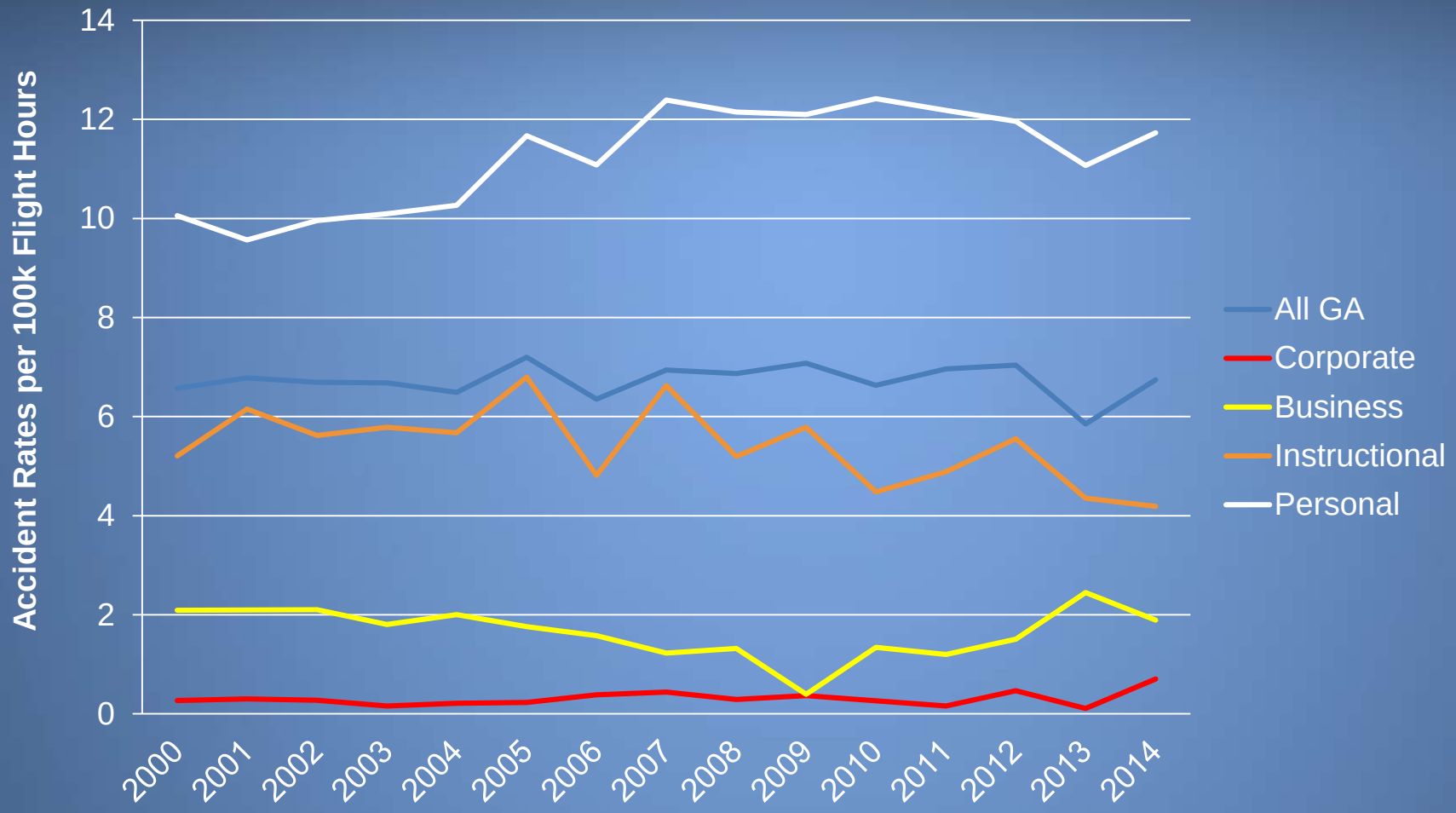
Accident Rates per 100k Flight Hours



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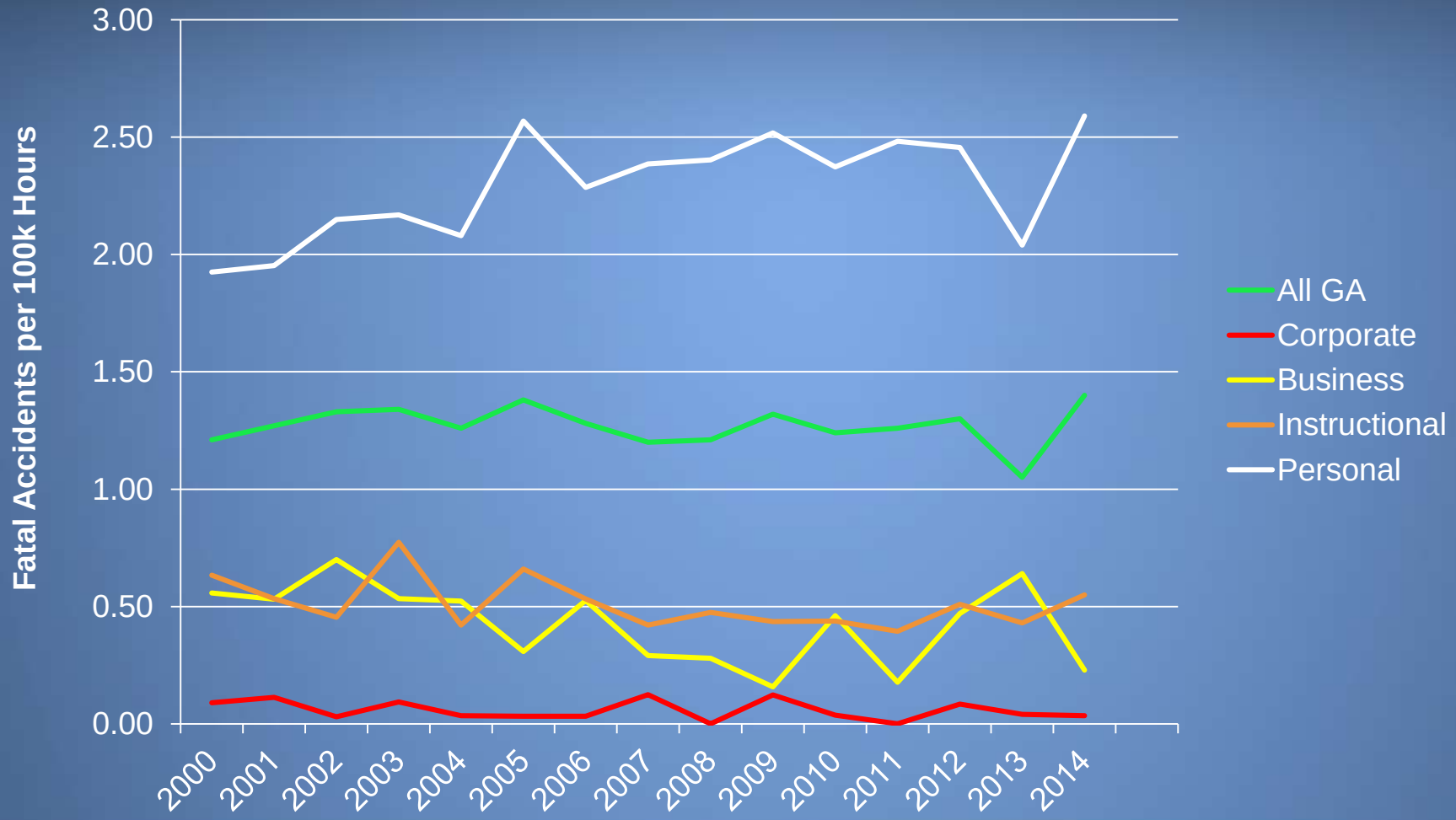
Fatal Accident Rates per 100k Flight Hours



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Summarizing GA Accident Data

- Overall GA accident rate is flat
  - Little improvement over past decade
  - Airline accident rate decreased more than 80% in same period
- Personal flying accident rate
  - Increased 13% in past decade
  - Fatal accident rate increased more than 15% in same period

Piston-Powered Twin Cessna Data*
April 1, 2013 to April 1, 2016

46 accidents in U.S.
- 14 fatal accidents
- 37 fatalities

5 accidents in foreign countries
- 4 fatal accidents
- 10 fatalities

*Does not include Cessna 337

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Aircraft Type	Number of Accidents	Number of Fatal Accidents
Cessna 303	1	1
Cessna 310	17	5
Cessna 340	10	5
Cessna 401	1	0
Cessna 402	4	1
Cessna 404	1	1
Cessna 414	6	2
Cessna 421	10	3
Cessna T50	1	1
Total	51	19

Cessna T-50

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NTSB News

NTSB will determine the probable cause ... 2, 201... Washington Metropolitan Area Transit ... rail accident, during a board meeting here sched... 016.

Read More

1 2 3

Latest Report

4/19/2016 - : Safety Recommendation Report: Crash-Resistant Fuel Systems on Airbus Helicopters

4/18/2016 - : DCA16FR007_prelim

4/5/2016 - : Preliminary Report: Railroad DCA16MR004

Safety Compass Blog

Read the latest from the Safety Compass blog. The Official Blog of the NTSB Chairman

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Preliminary report on the April 19 crash of a VANS RV12 in Stevensville, MD: go.usa.gov/cuKJe

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Embed View on Twitter

Upcoming Events

5/3/2016 - Board Meeting: Washington Metrorail Accident

5/10/2016 - Forum: Pedestrian Safety

5/14/2016 - Safety Seminar: Loss of Control: Training Solutions

Speeches and Testimony

Board member and staff remarks concerning transportation safety:

Chairman Christopher Hart
Vice Chairman T. Bella Dinh-Zarr
Member Robert Sumwalt
Member Earl F. Weener

NTSB SAFETY ALERT

National Transportation Safety Board

Pilots: Fueling Mistakes

Learn how to detect if your aircraft has been misfueled

The problem

Misfueling can occur for a variety of reasons and typically results in a complete loss of engine power, which may lead to serious injuries and/or death.

- While fuel nozzles and fuel fillers are designed to prevent misfueling, our investigations have found numerous modifications that can allow misfueling to occur. For example, aviation gasoline (avgas) nozzles are small and round and fit into smaller opening fuel filler ports while jet fuel nozzles are larger and flattened like a duck's bill, requiring a larger fuel filler port (see figures 1 and 2). However, our investigations have shown that some fixed base operators (FBOs) are modifying their jet fuel nozzles with the smaller avgas nozzle or other smaller type nozzle, such as the round jet spout nozzle, to more easily fuel smaller turbine helicopters. These non-standard jet fuel nozzles can easily fit into the smaller filler ports of aircraft that require avgas and allow for misfueling to occur.

Figure 1. Photograph of an avgas nozzle.

Figure 2. Photograph of Jet A fuel nozzle.

- When an aircraft is modified from using a reciprocating engine (avgas) to a turbine engine (jet fuel), some supplemental type certificates (STCs) have not required that the fuel filler port size be changed accordingly. As a result, line personnel have had to make accommodations such as installing an avgas fuel nozzle or round jet nozzle on a jet fuel truck to allow jet fuel into the smaller

MISFUELING EPIDEMIC

by TTCF Staff

In April of this year, one of our members who owned a 1974 421B survived a crash landing due to a dual engine failure in IMC. The airplane had been misfueled with Jet A. His accident is the third misfueling accident to occur since August of 2014. The other two were fatal, and one of them involved another 421.

Misfueling accidents in piston twins are often fatal. The owner of this 421 was lucky to walk away with minor injuries.

This was a problem that we all thought would be solved back in 1987 when the FAA issued AD 87-21-01 which mandated the installation of fuel restrictors on aircraft using avgas. The restrictor was designed to prevent the wide "duck bill" Jet A fuel nozzles from fitting into the fuel tank. Surely, this combined with clear labeling near the gas cap, would stop the rash of misfueling incidents, we all thought. Not so! The accident history shows there are multiple ways an aircraft can be misfueled. Here are a few:

Top: A Piper Cheyenne fuel filler with the Jet A fuel nozzle restrictor installed. Bottom: The accidental 421 without the restrictor. Is the restrictor installed on your airplane?

The FBO may not have the proper fuel nozzles. There have been multiple instances of this. In the case of our member's accident, the FBO had removed the duck billed nozzle and replaced with a smaller nozzle in order to make the refueling of military helicopters easier.

The lineman may not know what he's doing. This has always been a problem. FBOs must provide training but it is often cursory. And for someone not intimately familiar with airplanes, telling the difference between a 421 and a 425 or King Air is challenging. In our member's case, the lineman said he thought the 421 was a King Air. There have been instances where avgas airplanes with restrictors have been refueled with duck billed Jet A nozzles. You'd really have to work to make that happen and it illustrates that once a lineman decides your airplane takes Jet A, he will do what it takes to fuel your airplane with it.

The FBO may have misfueled its trucks. There have been instances of Jet A being in an avgas truck. A twist on this theme is that many FBOs park their fuel trucks in special parking places but misfueling has occurred when the Jet A truck was mistakenly parked in the Avgas truck space. The lineman just grabs the truck in the avgas space and starts fueling.

> **"Just looking at a fuel sample is not enough:**
>
> **AVGAS + JET A = BLUE!"**

The jet fuel nozzle on the left has a wide "duck-bill" opening, a feature designed so the AD 87-21-01 restrictor mounted.

AD 87-21-01 may not have been complied with. Our member's aircraft did not have the fuel restrictors.

So how do we protect ourselves against misfueling? You may think the victims of misfueling incidents didn't compare their fuel. Avgas is blue and comes in clear or "straw" colored, right? Jet A is clear or "straw" colored, right? Here's the kicker: a 50-50 mix of 100LL and jet is also blue. It may be slightly paler but you would not be able to tell the difference unless you held it up to pure 100LL.

Just looking at a fuel sample is not enough: Avgas + Jet A = BLUE!

So if a visual inspection is not sufficient, what can we do to ensure we have the correct fuel? Here is a list of things in order of importance:

1. **Always smell your fuel.** Jet A has a distinctive kerosene odor that will be present even in low percentage mixes.
2. **Conduct the paper-staining test.** If you put a drop of avgas on a piece of white paper or a paper towel, within a few minutes it will evaporate completely leaving no stain whatsoever. If the sample has as little as 10% Jet A, it will leave a visible oily stain. If you see the stain, you've likely been misfueled.

If you use a GATS jar to sample your fuel, you can test for jet fuel contamination in the same sort of way by blowing on the screen after taking a fuel sample. Avgas will evaporate while avgas contaminated

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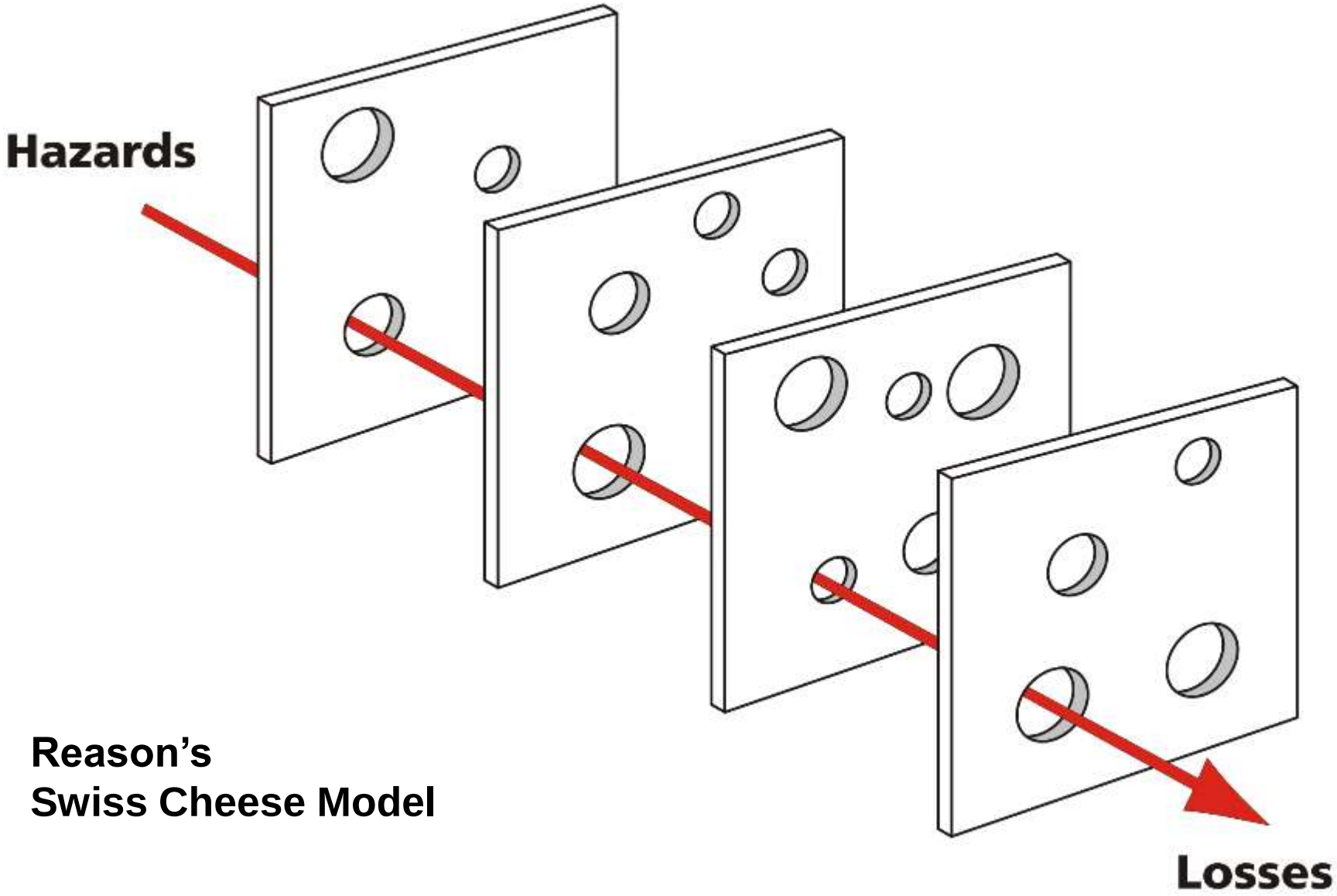
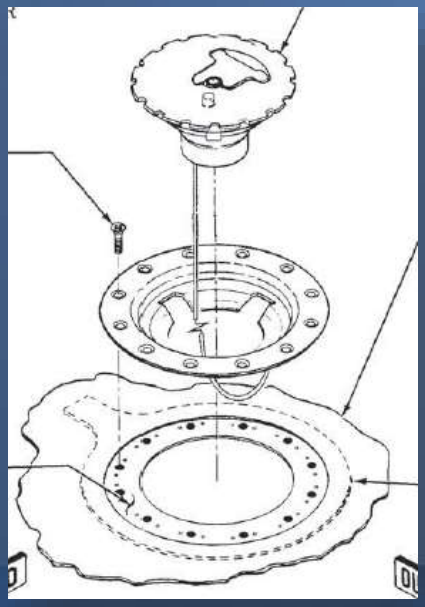


Reason's
Swiss Cheese Model

Potential Layers of Defense



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Las Cruces, NM

August 27, 2014

4 Fatal

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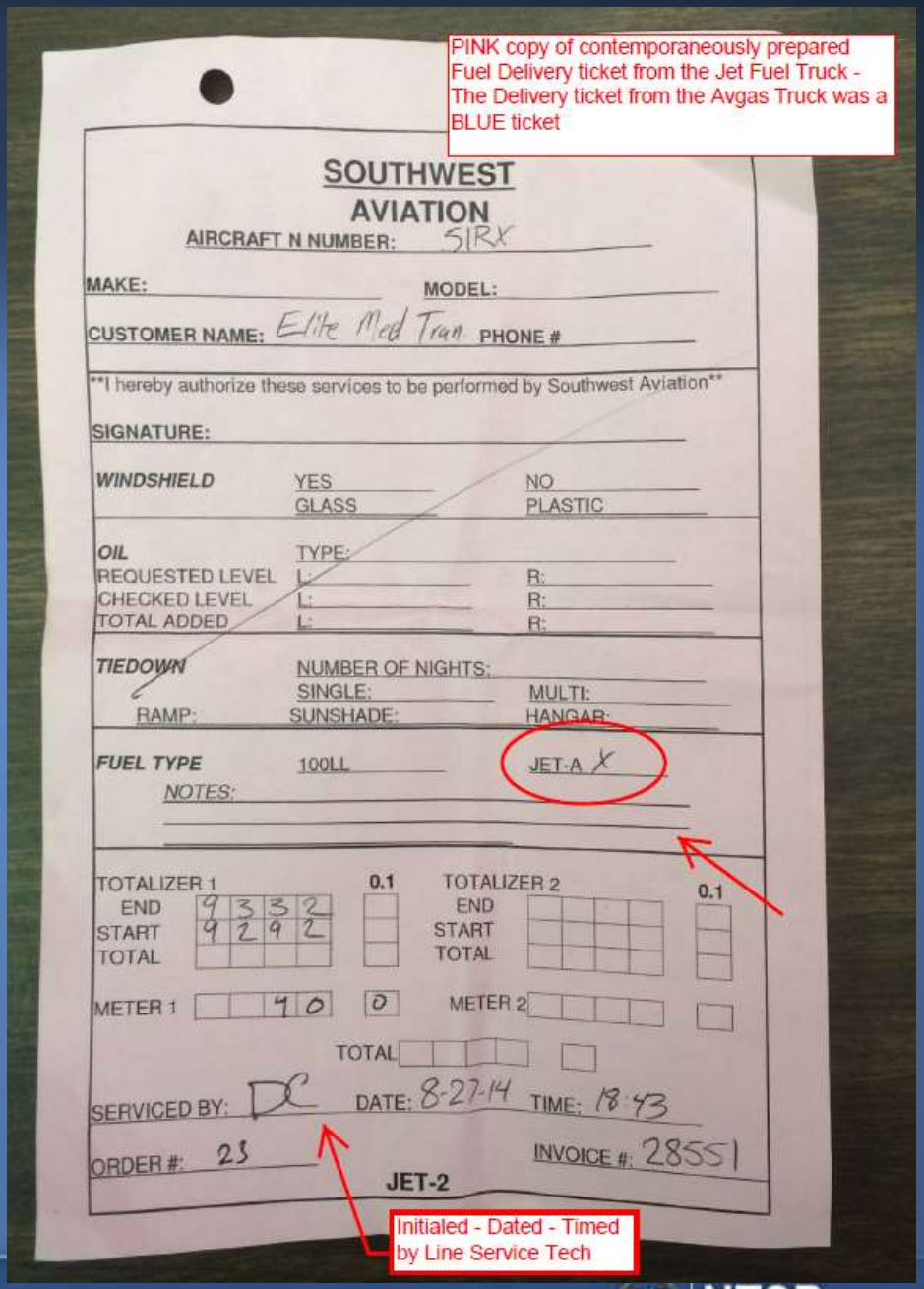
Problem:

Standard jet fuel nozzle would not fit turbine-powered helicopter that was based at Las Cruces

Work-around:

Replace standard jet fuel nozzle with one typically used for Avgas.

Fuel delivery slip showed Jet-A was delivered.



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Fuel payment slip:

Because this aircraft was a regular customer and had a direct billing account, when aircraft N-number was entered, billing computer "knew" that's what this aircraft used.

It looked right to pilot, so he signed it.

Phillips 66 Aviation Fuel

Airport:LRU1
Southwest Aviation Inc
Las Cruces, NM

Transaction: 19:46:08
08/27/2014

Ship Date: 08/27/2014

Ticket: 028551 Aircraft: N51RX

	Qty	Price
Aviation Gas	40	0.00
		$.00

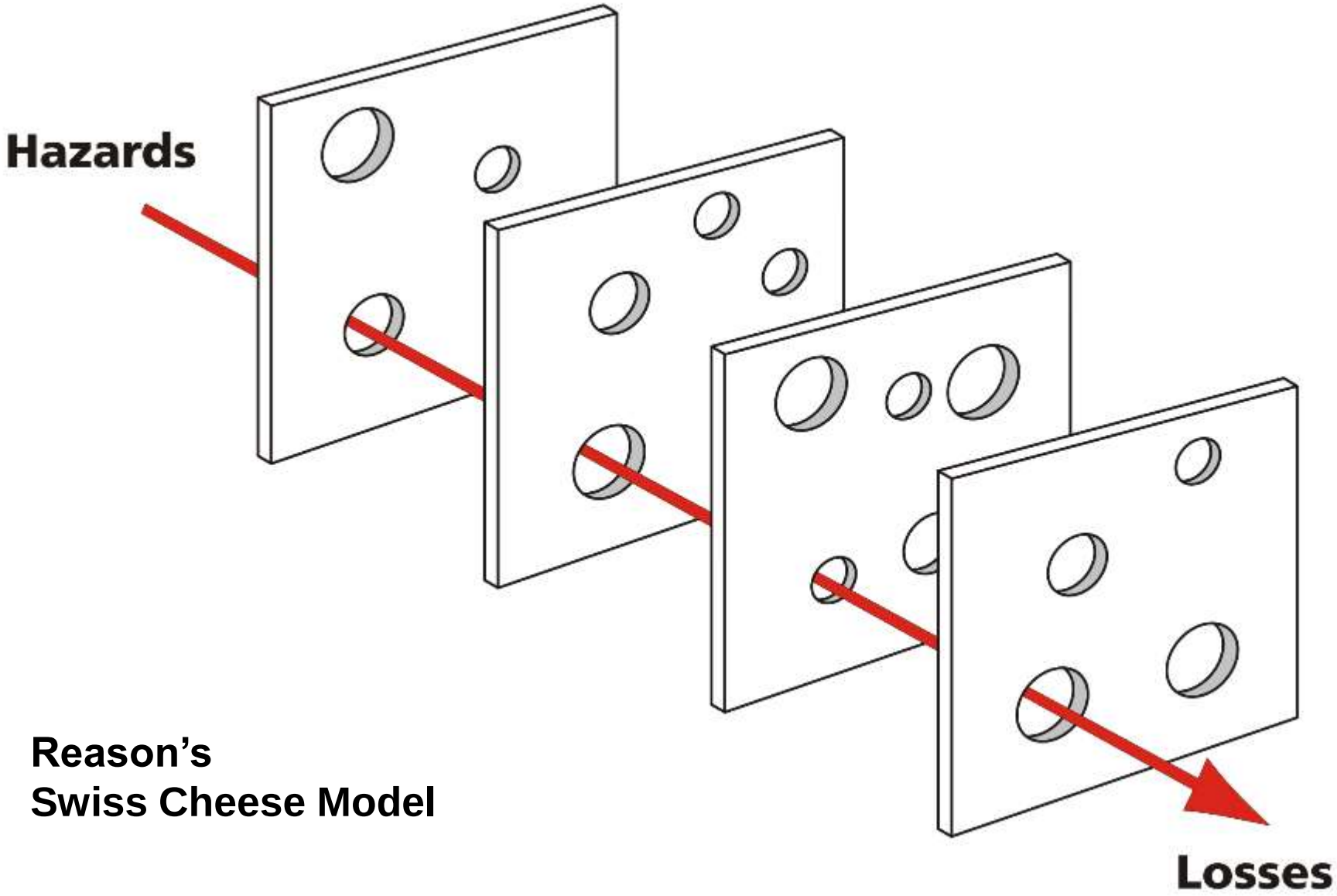
Customer Agrees to Pay the above Total Amount according to the Card Issuer Agreement.

Phillips 66 Company

ELITE MEDICAL AIR TRANSPORT, LLC
6989000390

[redacted]

Customer Signature



Reason's
Swiss Cheese Model


August 27, 2014

April 17, 2015. Diboll, TX

AVFUEL

AVFUEL LOCATION
Angelina County Airport
KLFK
(936)634-7511
airport@angelinacounty.net
http://www.angelinacounty.net/

04/16/2015

Jet A Fuel with FSII Additive
53 US Gallon @ 3.77100 /GAL
Federal Tax Jet
TOTAL (USD)

Customer Signature

[redacted]

and/or services rendered. Card payments are governed by card issuer agreement.

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Requires Avgas

Requires Jet Fuel

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2016 NTSB Most Wanted List

- Disconnect from Deadly Distractions
- Reduce Fatigue-Related Accidents
- Improve Rail Transit Safety Oversight
- Promote Collision Avoidance Technologies in Highway Vehicles
- Strengthen Occupant Protection
- Prevent Loss of Control in General Aviation
- Promote Completion of Rail Safety Initiatives
- End Substance Impairment in Transportation
- Require Medical Fitness for Duty
- Expand use of Recorders to Enhance Transportation Safety

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Prevent Loss of Control in General Aviation

Defining Events – Part 91 Ops

Business	Instruction	Personal
1. Loss of Control	1. Loss of Control	1. Loss of Control
2. CFIT	2. Midair	2. Powerplant Fail
3. Fuel	3. Powerplant Fail	3. CFIT
4. Component Fail	4. CFIT	4. Other
5. Powerplant Fail	5. Other	5. Component Fail

FACT

Between 2008 and 2014, appx. 47 percent of fatal fixed-wing GA accidents were Loss of Control.

These accidents claimed over 1200 lives.

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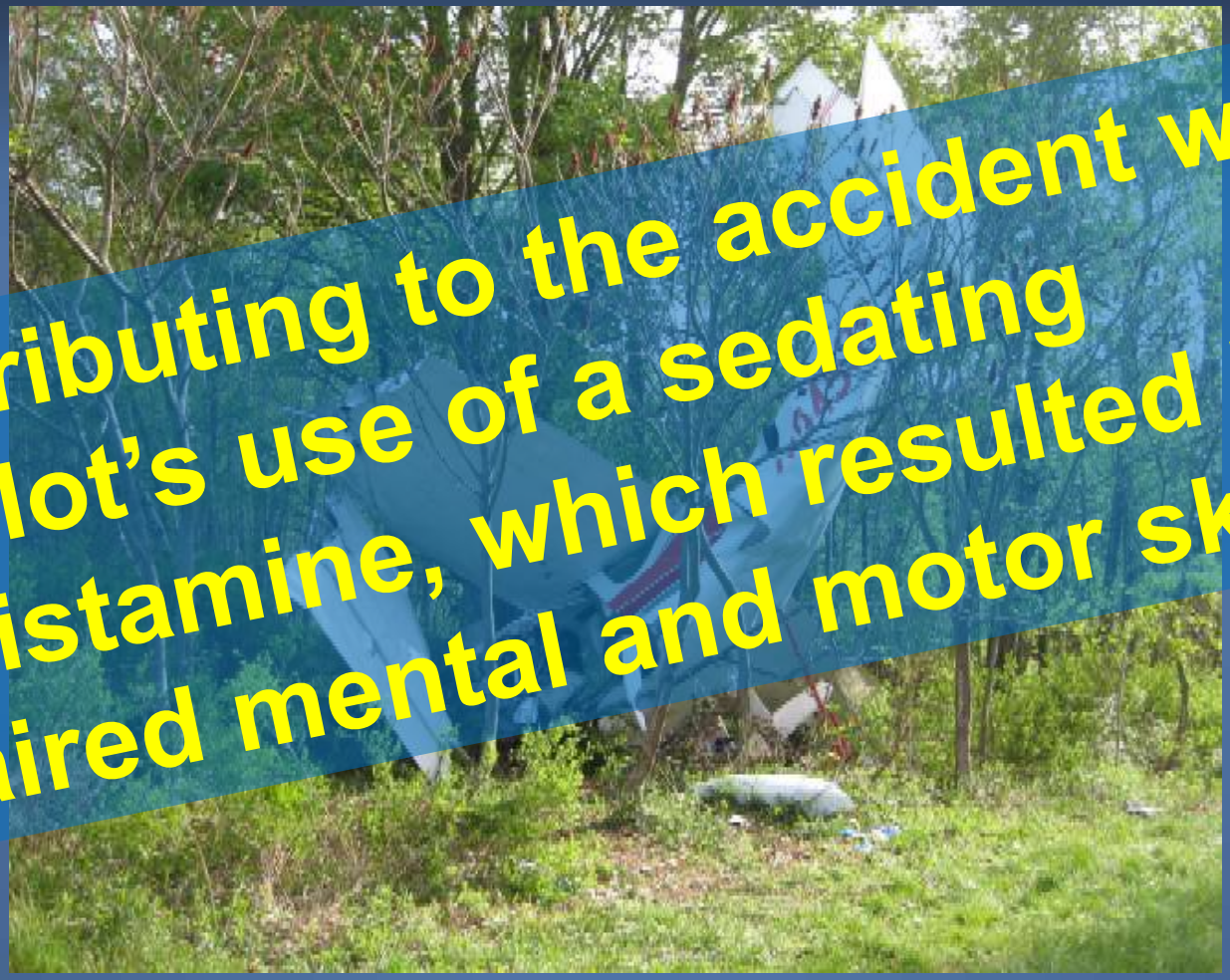
End Substance Impairment in Transportation



"Contributing to the accident was the pilot's use of a sedating antihistamine, which resulted in impaired mental and motor skills."

End Substance Impairment in Transportation

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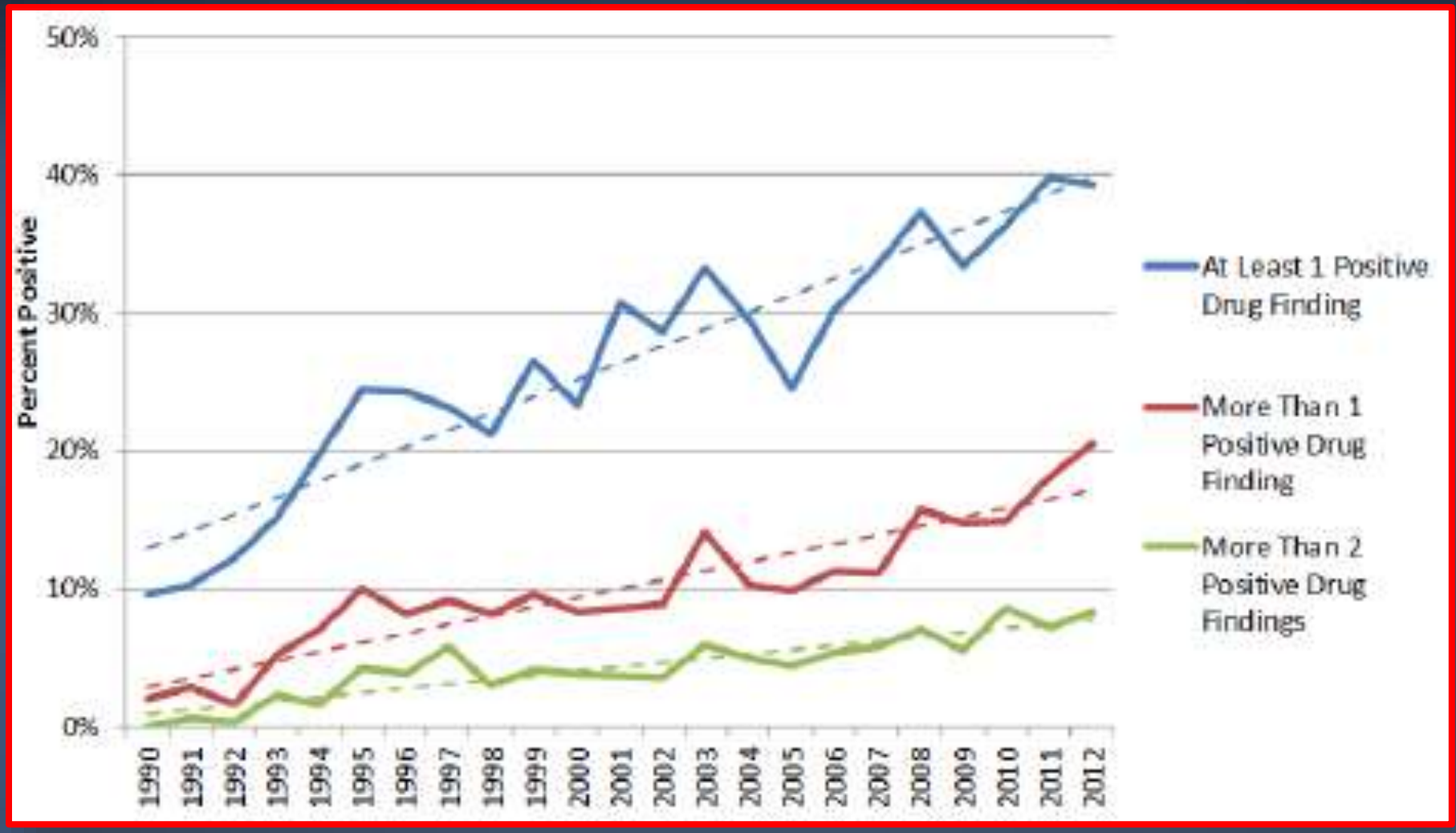
50%
40%
30%
20%
10%
0%
Percent Positive
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
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2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
At Least 1 Positive Drug Finding
More Than 1 Positive Drug Finding
More Than 2 Positive Drug Findings


A Few Tips
to Avoid This

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Negative Publicity Avoidance

e State
UTH CAROLINA • FRIDAY, FEBRUARY 4, 2000 The Switchboard (803) 771-6161 • CAPITAL FINAL

Pilots' acts might have led to crash

■ Tail section of doomed jet found on ocean floor

By ERIC MALNIC, MATT SURMAN and MITCHELL LANDSBERG
Los Angeles Times

PORT HUENEME, Calif. — Investigators are considering whether the pilots of Alaska Airlines Flight 261 unwittingly triggered their violent plunge into the Pacific Ocean by following prescribed procedures for an emergency landing, air safety officials said Thursday.

Late Thursday searchers found the tail of the jet after recovering the flight data recorder earlier in the day.

Underwater robots exploring the ocean floor found where the wreckage came to rest after the MD-83

ies, some of which are believed trapped under the debris.

National Transportation Safety Board officials raised the question about the pilots' actions after listening to a recording of the final 30 minutes that was contained in a cockpit voice recorder retrieved late Wednesday.

One NTSB official, speaking on condition of anonymity, said the investigation into the crash is increasingly focusing on the pilots' actions during their preparation for an emergency landing at Los Angeles International Airport.

In hindsight, investigators say, it appears possible that a by-the-book response to the mechanical problem reported by the pilots — a "horizontal stabilizer jam" — could have sent the plane into its wild, corkscrewing descent into the sea.

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Take the Most Conservative Approach

What to do?

Delay for better weather?

Go now?

Divert?

Continue?

Stop for fuel?

Press on?

Take the most conservative approach.

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CAUTION

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SOP Adherence

Standard Operating Procedures

- Research from over 15,000 observed airlines flights shows that when we deviate from SOPs, we are approximately three times more likely to commit additional errors with consequential results.

- “Normalization of Deviance”

Avoid Selective Compliance

- "That is a stupid rule."
- "I don't have to comply with that one."

Cessna 340A
October 4, 2013
4 Fatal

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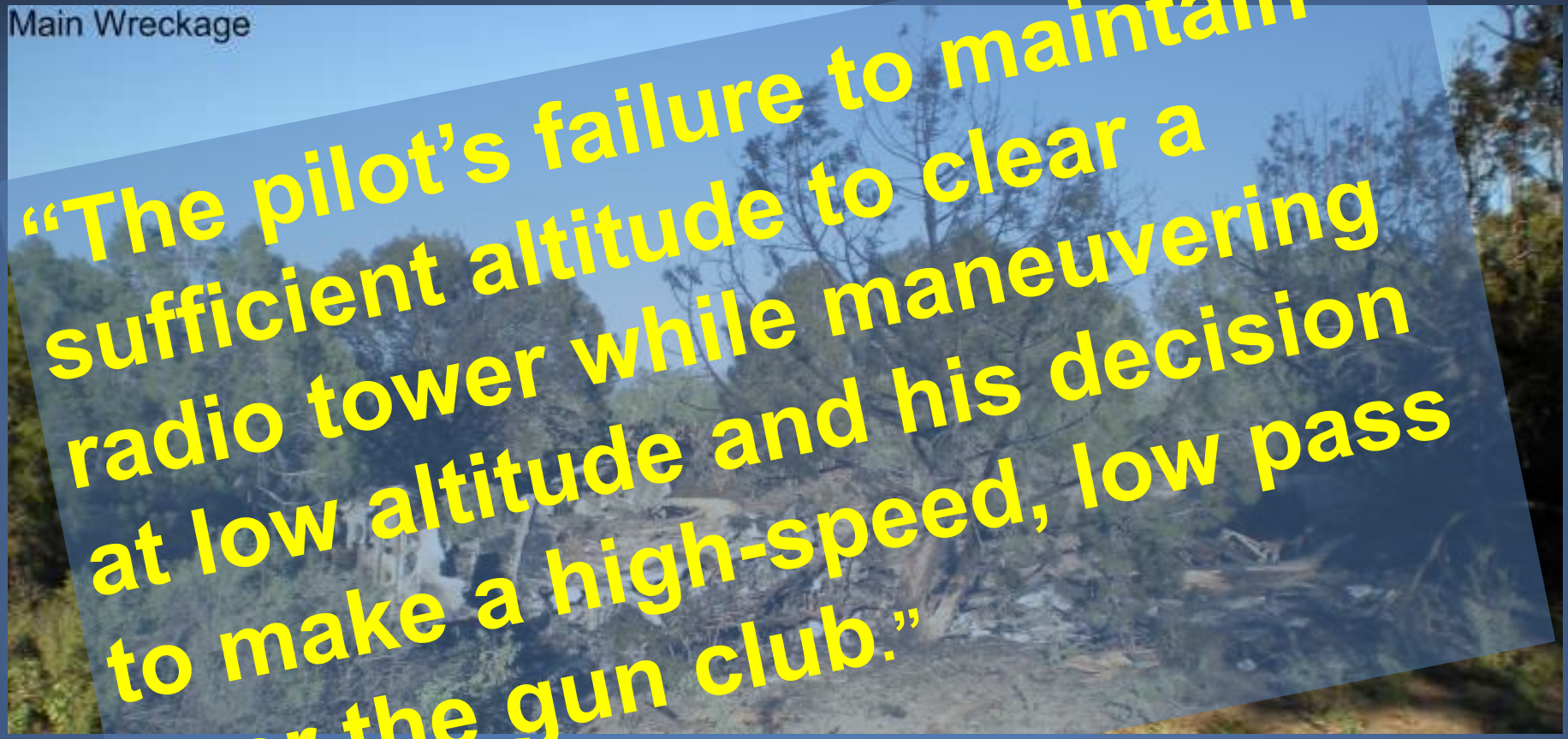

"The pilot's failure to maintain sufficient altitude to clear a radio tower while maneuvering at low altitude and his decision to make a high-speed, low pass over the gun club."

Cessna 340A
October 4, 2013
4 Fatal

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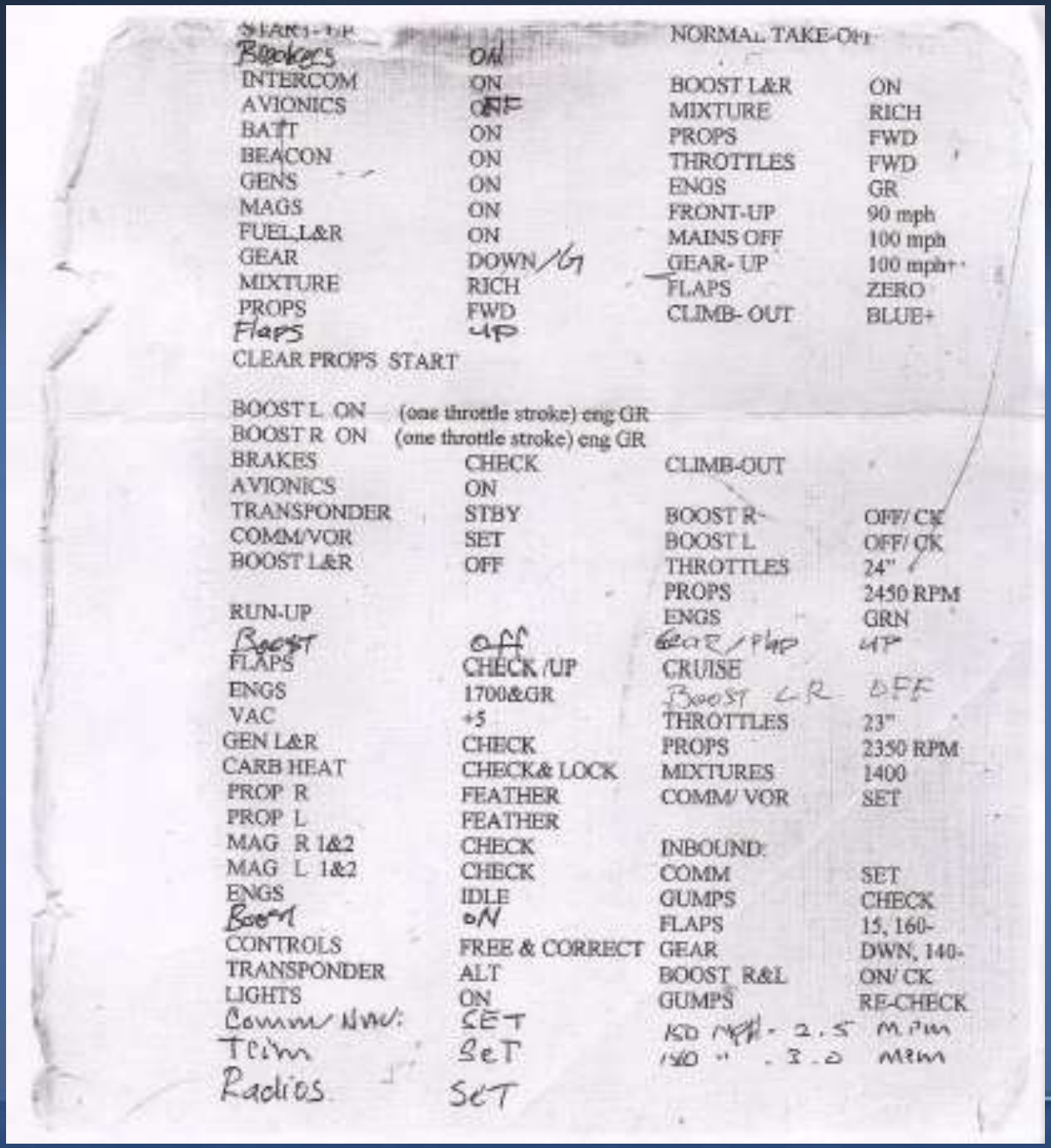
Be Professional

What is a professional?

- A mindset
  - Precise checklist usage
  - Precise compliance with SOPs and regulations
  - Staying abreast and current with knowledge and skills
  - The ability and willingness to say “I don’t know” or “I am wrong”



START-UP

Brakes	ON
INTERCOM	ON
AVIONICS	OFF
BATT	ON
BEACON	ON
GENS	ON
MAGS	ON
FUEL L&R	ON
GEAR	DOWN/GR
MIXTURE	RICH
PROPS	FWD
Flaps	UP

CLEAR PROPS START

BOOST L ON (one throttle stroke) eng GR
BOOST R ON (one throttle stroke) eng GR

BRAKES	CHECK
AVIONICS	ON
TRANSPONDER	STBY
COMM/VOR	SET
BOOST L&R	OFF

RUN-UP

Boost	off
FLAPS	CHECK /UP
ENGS	1700&GR
VAC	+5
GEN L&R	CHECK
CARB HEAT	CHECK& LOCK
PROP R	FEATHER
PROP L	FEATHER
MAG R 1&2	CHECK
MAG L 1&2	CHECK
ENGS	IDLE
Boost	ON
CONTROLS	FREE & CORRECT
TRANSPONDER	ALT
LIGHTS	ON
Comm/Nav:	SET
Trim	SET
Radios	SET

NORMAL TAKE-OFF

BOOST L&R	ON
MIXTURE	RICH
PROPS	FWD
THROTTLES	FWD
ENGS	GR
FRONT-UP	90 mph
MAINS OFF	100 mph
GEAR- UP	100 mph+
FLAPS	ZERO
CLIMB- OUT	BLUE+

CLIMB-OUT

BOOST R-	OFF/ CK
BOOST L	OFF/ CK
THROTTLES	24"
PROPS	2450 RPM
ENGS	GRN
Gear/Flap	UP

CRUISE

Boost L R	OFF
THROTTLES	23"
PROPS	2350 RPM
MIXTURES	1400
COMM/ VOR	SET

INBOUND:

COMM	SET
GUMPS	CHECK
FLAPS	15, 160-
GEAR	DWN, 140-
BOOST R&L	ON/ CK
GUMPS	RE-CHECK

KD MPH - 2.5 MPM
160 " - 3.0 MPM

Professionalism

Doing the right things,
even when no one is watching.

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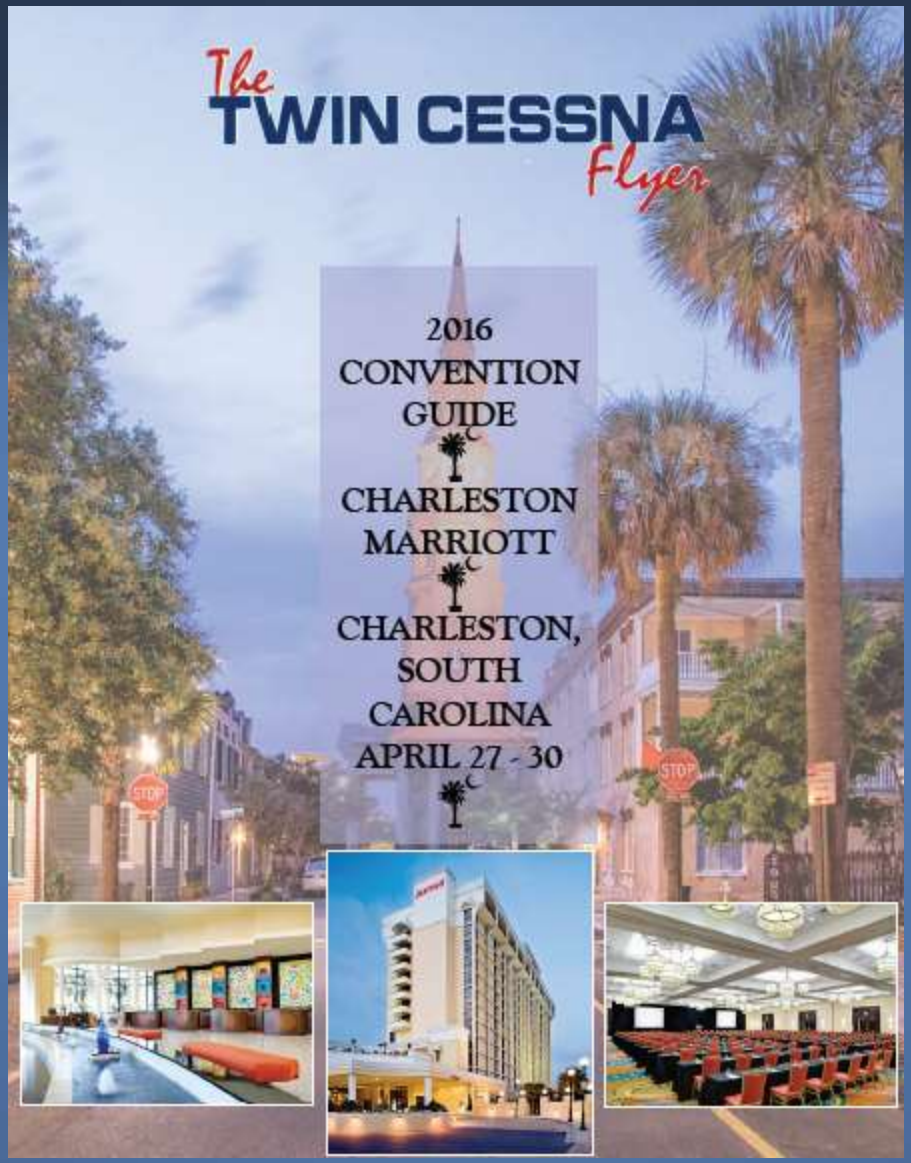
The
TWIN CESSNA
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MARRIOTT
CHARLESTON,
SOUTH
CAROLINA
APRIL 27 - 30

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